THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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MYCOLOGICAL NOMENCLATURE AT THE 7TH INTERNATIONAL BOTANICAL CONGRESS

John A. Stevenson and Donald P. Rogers

The nomenclature section of the 7th International Botanical Congress at Stockholm, July 6-20, 1950 had before it for action 542 proposals involving changes in or additions to the International Rules of Botanical Nomenclature. These proposals were brought together in a volume of 255 pages prepared by Dr. J. Lanjouw, rapporteur general, which gives some idea of the task before the section and why eleven sessions were necessary to work over this mass of material.

All items of particular concern to the nomenclature of the fungi were referred to the fungus committee. Dr. C. L. Shear had been secretary of this committee for many years but resigned just prior to the opening of the Congress because of ill health. Donald P. Rogers of the New York Botanical Garden assumed the duties and responsibilities of the position. Very few of the members of the original committee as appointed at Amsterdam in 1935 or of those added at Utrecht in 1948 were present. Those who were present decided at their first get-together to invite participation with voting privileges by all interested mycologists attending the Congress, thus raising the number of participating committee members from nine to 20. Six long evening committee meetings were held thereafter and decisions (not always unanimous) were arrived at on all points at issue. A mimeographed report embodying the committee decisions was prepared for presentation to the nomenclature section of the Congress, which adopted the report in its entirety. The decisions of the nomenclature section were in turn ratified by the Congress in the final plenary session.

A review of the fate of the several proposals affecting the nomenclature of the fungi, with particular reference to those put forward by the committees on mycological nomenclature of the American Phytopathological Society and the Mycological Society of America, follows. A number of items of general interest to all groups are also included. It should be noted that many proposals were adopted in principle, with the final wording left to the editorial committee, so that it will not be always possible to state what the final wording of modified rules and recommendations will be.

Article 8. In modifying this article, the new term taxon (plural: taxa) was adopted to be applied to taxonomic groups of any rank. This term will appear throughout the new rules.

Article 10. The mycological committee voted to inform the section that either Article 10 as it stands or Lam's proposed modification would be correct mycologically. The latter proposal was accepted, providing for consecutive upward taxa as follows: species, genus, family, order, class, and division. The question at issue was whether the Fungi Imperfecti really belonged to species, genera, and so on, and the action of the committee made it clear that they were to be so classified.

Article 11. This article provides for subdivisions of species. A proposal to treat "formae speciales" as varieties was vetoed. It was recommended that proposition one to modify this article be adopted to provide for taxa in descending rank as follows: subspecies, variety, subvariety, and form, possibly deleting "forma biologica" and certainly deleting "forma specialis in parasitic species". The latter category is to be retained as provided in Recommendation one, but without a hierarchical position.

Recommendation I. The committee voted for the retention of this recommendation, which covers parasitic fungi, with the substitution of "taxa" for "forms" and with two corrections in the text, "specific" to replace "special" (inserted by error in the Congress "Synopsis") and the plural "formae speciales" to replace "forma specialis".

Article 13. Proposition one proposed to modify this article by adding "names given to taxa placed in categories denoted by misplaced terms are treated as not validly published." The fungus committee recommended the following amendment to this: "An exception is made for names of subdivisions of genera in Fries' Systema Mycologicum, which are treated as validly published although he termed them 'tribes' (tribus)". The new proposal without this amendment would seriously disturb the present legitimate nomenclature of certain fungus groups.

Article 18. A special committee prepared a new draft of this article based on the several

proposals submitted, which, subject to editorial changes, is as follows:

The application of names of taxa is determined by means of nomenclatural types. A nomenclatural type (typus) is that constituent element of a taxon to which the name of the taxon is permanently attached, whether as an accepted name or a synonym. (The name of a taxon must be changed if the type of the name is excluded (see art. 66).)

Note 1: The nomenclatural type is not necessarily the most typical or representative element of a taxon; it is merely that element with which the name of the taxon is permanently associated.

Note 2: A holotype ("type" "typus") is the one specimen or other element used by the author or designated by him as the nomenclatural type (that is, the element to which the name of the taxon is permanently attached).

Note 3: If no holotype has been indicated by the author who described a taxon, or when the holotype is lost or destroyed, a substitute for it must be chosen. The author who makes this choice must be followed unless it can be proved that the choice was not made in accordance with Art. 18 bis.

A substitute type may be either a lectotype or a neotype. A lectotype always takes precedence over a neotype.

A lectotype is a specimen or other element selected from the original material to serve as nomenclatural type when the holotype ("type" "typus") was not designated at the time of publication or so long as it is missing.

A neotype is a specimen selected to serve as nomenclatural type so long as all of the material on which the name of the taxon is based is missing.

When two or more specimens have been designated as types by the author of a name (i.e. male and female, flowering and fruiting, etc.), one of them must be designated as lectotype.

Recommendation

For other specimens of special interest the following terms are recommended:

A paratype is a specimen cited with the original description other than the holotype. An isotype is a specimen believed to be a duplicate of the holotype. A syntype is one of two or more specimens or elements cited with the original description when no holotype was designated, or one of two or more specimens simultaneously designated as type.

Recommendation

It cannot be too strongly recommended that the original material, especially the holotype, of a taxon be deposited in a permanent, responsible institution and that it be scrupulously cared for and preserved. When living material has been designated as type, it should be immediately preserved, whether it be a living plant in garden or greenhouse, or a culture in vitro.

Art. 18 bis.

The choice of a lectotype or neotype is not binding if the original material is discovered, or if it can be shown that the choice was based on misinterpretation of the original description.

Art. 18 ter.

Names based on types derived from modern material, Algae excepted, always take precedence over names based on fossil or subfossil specimens.

Art. 18 quater.

The nomenclatural type (holotype, lectotype, or neotype) of a species or of a taxon below the rank of species is a single specimen or other element which is indicated as the type by the author of the name, except in the following cases (1, 2, and 3) and in that of Art. 18 note 3.

1) For small herbaceous plants and for most non-vascular plants the type may consist of more than one individual, which ought to be conserved permanently and assembled on one herbarium sheet or preparation. If it is proved later that such a type herbarium sheet or preparation contains parts belonging to more than one taxon, the name must remain attached to that part which corresponds most nearly with the original description.

2) For plants for which it is impossible to preserve a type specimen, the type may be a figure and/or a description.

3) In a species without a type specimen, the type may be a description or figure.

4) If a taxon is divided into a number of taxa of the same rank, the nomenclatural type of the original taxon must be the type of one of them.

5) If a taxon includes subordinate taxa its type must be or include the type of one of each of the taxa of each subordinate rank.

Art. 18 quinquies.

The nomenclatural type of an order and of taxa between order and family is a family, that of a family and of taxa between family and genus is a genus, and that of a genus and of taxa between genus and species is a species.

The nomenclatural type of a taxon above the rank of genus, to the rank of order, whose name is formed in accordance with the Rules, is always the lower taxon whose name was derived from the same root (generic name).

Note: It is not felt that the type method can, at present, be profitably applied to the nomenclature of taxa above the rank of order.

It should be observed here (and was brought out in committee discussion), that the first sentence of Art. 18, and the use of the word "element", make much of this series of Rules applicable to taxa other than species. Thus, for example, under Note 3, third paragraph, a lectotype of a genus must be one of the original species.

Recommendation VII. It was recommended that proposition one be adopted after modification to read as follows: "For those cryptogams for which the starting points of nomenclature (cf. Art. 20) are post-Linnaean, but for which the first legitimate specific epithet is accepted from a previously published cited Linnaean or post-Linnaean specific epithet, it may be desirable to accept the type of the pre-starting-point author." This statement will constitute a second paragraph of the Recommendation.

Article 20 e, f, h. (e) The committee voted unanimously to confirm Persoon's Synopsis Methodica Fungorum as the starting point for Uredinales, Ustilaginales, and Gasteromycetes, arbitrarily setting December 31, 1801, as its date of publication.

(f) By a majority vote it was decided to recommend as the starting point for the Fungi caeteri, Fries' Systema Mycologicum with the following wording in explanation. "Volume I of the Systema is treated as having appeared January 1, 1821 and the Elenchus Fungorum (1828) is considered to be a part of the Systema. Names of Fungi caeteri published in other works between the dates of the first and last parts of the Systema which are synonyms or homonyms of names of any of the Fungi caeteri included in the Systema do not affect the nomenclatorial status of names used by Fries in this work."

In further explanation it may be noted that it is the intent of Rule 20f as agreed upon by the committee that the Systema becomes the starting point for all Fungi caeteri therein included, but other fungus binomials set up by S. F. Gray, Schweinitz, Persoon, and others in the period between January 1, 1821 and December 31, 1832 may be legitimate if not so included by Fries. The new rule is based on the procedure discussed by Donk (Bull. Bot. Garden Buitenzorg III 18: 87-88. 1949) and his paper may be consulted for further details.

(h) Linnaeus, Species Plantarum (Ed. 1, May 1, 1753) was confirmed as the starting point for the Myxomycetes.

Recommendation VIII. This recommendation, which deals with the nomenclature of higher categories, was rewritten by an ad hoc committee. Names of taxa above the rank of order are not to be based on a type (cf. Art. 18 quinquies), but on a character or group of characters, as at present. Within the Fungi, names of divisions are to end in -mycota, of subdivisions in --mycotina, of classes in -mycetes, and of subclasses in -mycetidae.

New Article. The use of ordinal names ending in -ales and of subordinal names in -ineae is now obligatory, where before it was merely recommended; names in both ranks are to be taken from names of included families. The rule of priority does not apply to names above the family.

Article 36. Proposition 8 providing an amendment to the second paragraph of the article to the effect that "deposit of manuscripts in libraries or other institutions with microfilm or similar reproduction permitted, does not constitute publication", was finally accepted in principle with the details of wording left to the editorial committee.

Article 37. This article deals with valid publication and two propositions (7 and 8) which were accepted are worthy of note.

> (7). "Beginning with January 1, 1953 new transfers or new combinations will be considered validly published only when the basonym (name-bringing synonym) is clearly indicated with proper bibliographical reference."
>
> (8). "A binomial or other combination is not validly published unless the author definitely indicates that the epithets are to be used in a certain combination."

Article 38. Although all proposed changes in this article were rejected, Shaw's suggestion to substitute "1908 through 1934" for "1908 to 1934" in the next to the last line will undoubtedly be taken care of by the editorial committee, as indicated by the Rapporteur.

Article 39 bis. This proposed new article would have provided:

> A name of a taxon is not validly published unless it is based on a plant known to exist in the living or fossil state; an anticipating name of a presumptive plant is not validly published.
>
> Note. According to this article a specific name based on an imperfect state of a pleomorphic fungus before its perfect state is known but containing the generic name designating that perfect state is not considered validly published.

The fungus committee recommended the rejection of the "note", feeling that the subject matter should be covered by Article 57. The entire Article was rejected by the Section.

Recommendation XXIV. This recommendation, which dealt especially with the fungi, was changed to read "In describing new groups, it is well to add to the description figures, with structural details to aid in their identification. In the legends of the figures it is desirable to indicate the specimen(s) on which they are based and to conform to recommendation XLIX."

Article 47. The words "without exclusion of the type" were deleted from this article. The reasoning for this change has been presented by Rogers in the mimeographed statement of the American Mycological Committee and in Mycologia to the effect that the author must be the one "who first published the name in question" (Art. 46); that the deleted phrase seemed to imply the existence of as many genera having the same name as there are misapplications of the name; and that "exclusion of the type" is not defined. The force of this deletion was largely destroyed by the adoption of a new Article 47 bis, which provides that "Retention of a name in a sense which excludes the type can be effected only by conservation."

Article 57. The fungus committee presented the following text to replace the present article 57:

> "In Ascomycetes and Basidiomycetes with two or more states in the life cycle (except those which are lichen fungi), but not in Phycomycetes, the first valid name or epithet applied to the perfect state takes precedence. The perfect state is that which bears asci in the Ascomycetes, which consists of the spores giving rise to basidia in the Uredinales and of the chlamydospores in the Ustilaginales, or which bears basidia in the remaining Basidiomycetes. The type specimen of a state must bear that state. However, the provisions of this article shall not be construed as preventing the use of names of imperfect states in works referring to such states.
>
> "The author who first describes a perfect state may use the specific epithet of the corresponding imperfect state, but his binomial for the perfect state is to be attributed to him alone, and is not to be regarded as a transfer.
>
> "When not already available, binomials for imperfect states may be proposed at the time of publication of the perfect state or later, using either the specific epithet of the perfect state or any other epithet available."

It may be noted that this new wording definitely eliminates the Phycomycetes from the rule that the perfect state name of pleomorphic fungi takes precedence, thus accepting Bisby's and Stevenson's, and Shaw's, proposals that in this group the "first valid name applied to either the imperfect state (sporangia or conidia) or perfect state (oospores or zygospores) takes precedence." It also very definitely validates the use of imperfect state names when that is the state under study or discussion, even though the perfect state be known and named. For instance, a phytopathologist may use the name Rhizoctonia solani when that is the actual state under study, without reference to Pellicularia filamentosa (Corticium solani), the perfect state name. The new Rule therefore legalizes universal usage.

The so-called "Uredo" stage of the Uredinales is also explicitly eliminated from consideration as a "perfect state" name. This will necessitate a limited number of changes in names applied to American rust fungi as given in Arthur's manual.

Article 59 bis. This new article presenting the new principle of Nomina Excludenda (or Nomina Rejicienda) was proposed by the Royal Horticultural Society. It presented a way to permit the continued use of binomials, particularly of economic plants, now threatened by strict application of the present rules, without falling into the pitfalls of conserved specific names. This proposal was seconded by a majority vote of those American mycologists to whom the matter was referred. The proposal was rejected by a vote of 116 to 242.

It may be noted here that after a lengthy discussion the principle of Nomina Specifica Conservanda was similarly rejected by a vote of 40 to 320. Finally, the Section voted against authorizing a committee to investigate further the matter of nomina specifica conservanda and rejicienda, thus indicating that it condidered the question closed.

Article 64. For this article dealing with Nomina Confusa the fungus committee recommended the acceptance of proposition 2, which substituted the following wording for the present form: "A name of a taxonomic group must be rejected if the characters of that group were derived from two or more entirely discordant elements, unless it is possible to select one of these elements as a satisfactory type for the name." The provision that a list of names to be abandoned under the article (nomina confusa) form Appendix V was eliminated.

The wording of this article in either its present form or in the modified form adopted throws doubt on the status of the lichens. To clarify the situation several proposals were put forward and from them the fungus committee drew up the following compromise statement which was adopted: "For nomenclatorial purposes names given to lichens shall be considered as applying to their fungal components, but shall be subject to the provisions of Article 20 d."

Recommendation XLIII. The matter of decapitalization of specific epithets evoked much discussion, but rather surprisingly at an early session the following wording (proposition 1) was accepted "Specific and subspecific epithets should be written with a small initial letter." At a later session, however, the Section reversed itself and proposition 6 was substituted: "All specific and trivial names or epithets should be written with a small initial letter, although writers desiring to use capital initial letters for particular names or epithets may do so when these are directly derived from the names of persons (or deities), or are vernacular (or barbaric) names, or are previously published (including pre-Linnean and invalid) unmodified generic names." This puts the emphasis on decapitalization of all specific names, but leaves the door open to those who prefer to capitalize in the cases provided in the recommendation.

Appendix 1. Regulations for determining types. From the several proposals submitted under this heading the committee, mentioned under Article 18, prepared and submitted the following which was adopted by the Section: (See also under Article 18 for regulations on the type method itself.)

> "The following set of suggestions is intended both as a guide to the application of the Rules and as an indication of sound practice in the determination or selection of the nomenclatural types of previously published taxa. Where the application of a rule is embodied in a suggestion, reference is made to the appropriate article.
>
> "1) The choice of the original author, if definitely expressed at the time of the original publication of the name of the taxon, is final. If he included only one element, that one must always be accepted as the holotype. (See Arts. 18, 18 quater). If a new name is based on a previously published description of the taxon, the same considerations apply to material cited by the earlier author.

"2) When a new name was published as an avowed substitute (nomen novum) for an older one (a new name based on the description accompanying an illegitimate one), the type of the new one is automatically that of the old one.

"3) A lectotype may be chosen only when an author failed to designate a holotype, or when in species or taxa of lower rank, the type has been lost or destroyed. (Art. 18 note 3.)

"4) Designation of a lectotype should only be undertaken in the light of an understanding of the group concerned. Mechanical systems, such as the automatic selection of the first species or specimen cited or of a specimen collected by the person after whom a species is named, should be avoided as unscientific and productive of possible future confusion and further change. The original description of the taxon concerned should be the basic guide. (Art. 18 bis.)

"a) In choosing a lectotype any indication of intent by the author of a name should be given preference unless it is contrary to his description and remarks. Such indications are manuscript notes, annotations on herbarium sheets, recognizable figures, epithets such as typicus, genuinus, vulgaris, communis, etc.

"b) A lectotype must be chosen from among elements that were definitely studied by the author up to the time the taxon was published and included in it when it was published. (Art. 18 note 3).

"c) Other things being equal, specimens should be given preference over pre-Linnean or other cited descriptions or plates when designating lectotypes of species.

"d) In cases where two or more elements were included in or cited with the original description the reviewer must use his own judgment in selection of a lectotype, but if another author has already segregated out one or more elements as other taxa, the residue or part of it should be designated as the type if its essential characters correspond to the original description. If it can be shown that the element fitting the whole published original account has been removed, it shall be restored and treated as lectotype (Art. 18 bis).

"e) The first choice of a lectotype should be followed by subsequent workers unless it can be shown that the choice does not fit the original description as well as another of the original elements (specimens, species, a higher taxa, etc.) (Art. 18 bis).

"5) In selecting a neotype even more care and critical knowledge are essential, as the reviewer has usually no guide except his own judgment as to what best fits the original description. If his selection is faulty it will inevitably result in further change. The neotype may only be selected when all original material is believed lost or destroyed. (Art. 18 note 3, Art. 18 ter).

"6) For names of fossil species the lectotype where one is needed should, if possible, be a specimen illustrated at the time of the first valid publication.

"7) The nomenclatural typification of organ genera, form genera, of genera based on plant microfossils (pollen, spores, etc.), genera of imperfect fungi, or any other analogous genera, or lower taxa, does not differ from that recommended above."

Appendix III. Nomina generica conservanda. Although this principle had been accepted for many years and a long series of phanerogamic genera had been conserved, no action to that end had ever been taken for the fungi. At Stockholm the fungus committee selected from the several lists submitted those genera on which there was unanimous agreement and proposed them for conservation, subject to withdrawal if their nomenclatorial status was changed by modifications in the rules adopted at the Congress. The genera so conserved are as follows:

Nomina conservanda	Nomina rejicienda
Aleurodiscus Rab. ex Cke.	Cyphella Fr.
Calvatia Fr.	Langermannia Rostk.
	Hippoderdon Mont.
Clavaria Fr.	Clavaria Stackh.
Daldinia Ces. & de N.	Hemisphaeria Kl.
Marasmius Fr.	Micromphale Gray

Nomina conservanda (continued)	Nomina rejicienda
Melanogaster Corda	Bullardia Jungh.
Panus Fr.	Pleuropus Gray
Pleurotus (Fr.) Kummer	Crepidopus Pers. ex S. F. Gray
	Resupinatus Nees ex S. F. Gray
	Pterophyllus Lév.
	Hohenbühelia Schulzer
Septobasidium Pat.	Gausapia Fr.
	Glenospora Berk. & Desm.
	Campylobasidium Lagh. ex F. Ludwig
Stagonospora (Sacc.) Sacc.	Hendersonia Berk.
Tomentella Pers. ex Pat.	Caldesiella Sacc.
Tubercularia Tode ex Fr.	Tubercularia Wiggers
Uromyces (Lk.) Unger	Nigredo Roussel
	Caeomurus (Lk.) Gray
	Pucciniola March.

The remainder of the fungus generic names proposed for conservation were referred to the fungus committee with power to recommend to the general committee any on which agreement was reached for temporary approval. Final approval would rest with the next Congress in Paris, 1954.

Appendix IV Nomina dubia. This proposed new appendix was eliminated.

New appendix Rules for citation. Dr. Rickett's proposal on this subject was accepted, with details to be worked out by the editorial committee. It is as follows:

> "It is recommended that the editors of the next edition of the International Rules be instructed to bring all citations of literature therein into conformity, selecting that standard of citation which seems best fitted to the needs of taxonomy.
>
> "It is proposed that the system used be embodied in a set of suggestions to form an appendix to the Rules and to serve as a model for botanists in the future."

Supplementum Species Lectotypicae Propositae. The lists of proposed lectotypes of the genera of Agarics by Singer and A. H. Smith and of the clavarioid fungi by Doty were passed over as were similar lists in other groups of plants.

The 8th Congress and the International Society for Plant Taxonomy. Members of the special committee for fungi appointed by the 7th Congress to serve until the close of the 8th Congress to be held at Paris in 1954 are as follows: D. P. Rogers (U. S. A.) secretary, G. R. Bisby (England), K. B. Boedijn (Indonesia), R. Ciferri (Italy), M. A. Donk (Indonesia), C. W. Emmons (U. S. A.), J. W. Groves (Canada), R. Heim (France), I. Jørstad (Norway), J. Lanjouw (Holland) M. Le Gal (France), J. C. Lindquist (Argentina), W. J. Lutjeharms (Union So. Afr.), G. W. Martin (U. S. A.), J. A. Nannfeldt (Sweden), J. Ramsbottom (England), R. Singer (Argentina), J. A. Stevenson (U. S. A.), A. Trotter (Italy), E. M. Wakefield (England), S. P. Wiltshire (England).

Heretofore there has been difficulty in providing for continuity in matters of nomenclature and other pertinent botanical activities between Congresses. Committees often failed to function and there was a lack of any set-up with authority to keep affairs moving. To remedy this situation a new International Society for Plant Taxonomy was established at Stockholm. It will operate within the framework of the International Union of Biological Societies. It will take over the present Bureau of Nomenclature of the Botanical Congress on a permanent basis and will also be interested in other phases of plant taxonomy, such as Lanjouw's Index Herbariorum, preparation of a standardized plant terminology, and stimulation of the publication of handbooks such as the Sylloge Fungorum, Catalogus Lichenum Universalis, die Natürlichen Pflanzenfamilien, etc.

U. S. BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, DIVISION OF MYCOLOGY AND DISEASE SURVEY, BELTSVILLE, MARYLAND; and NEW YORK BOTANICAL GARDEN, NEW YORK

SUMMARY OF REGIONAL TESTS OF COTTON SEED TREATMENTS -- 1949

Cooperators: C. H. Arndt, L. M. Blank, L. A. Brinkerhoff, B. S. Hawkins, D. R. Hooton, S. C. Lehman, D. C. Neal, J. T. Presley, C. H. Rogers, D. M. Simpson, A. L. Smith, and V. H. Young

The regional cotton seed plantings of 1949 were designed primarily to ascertain the relative influence on seedling emergence of reginning and acid-delinting and also of the interaction of these two seed treatments with the rate of seeding. This departure from the objectives of previous years was thought necessary in order to determine whether the results obtained by Chester[1] had general applicability and should be considered by agricultural engineers in studies of the relation of the method of planting to mechanical harvesting. The plantings were not thinned or, if thinned, they were thinned to a predetermined number of plants in order that data might also be obtained on the relation between density of stand of plants and yields.

Two lots of seed were used, Coker-100W and Deltapine. Reginned and delinted seed were prepared from both lots, the reginned seed at the plants of the seed companies that supplied the seed and the delinted seed by the Kemgas process at Columbus, Mississippi. An unknown proportion of the seeds were removed in the automatic grading of the delinted seed.

It is possible that the delinted seed used in these plantings of 1949 may not be typical of seed delinted with sulfuric acid. In the Kemgas method used last season, the seed are treated with gaseous HCl, after which the lint is removed while the seed are passed over revolving screens. The seed are next passed over a mechanical grader, after which soda ash is applied to neutralize the acid. Ceresan is applied next with additional amounts of soda ash. There are evident undesirable features in this method of preparing the seed: (a) The soda ash increases the friction when the seeds are passing through the planter, and (b) the application of soda ash previous to the application of seed protectant makes uncertain the amount of the latter that may adhere to the seed.

Reginned and delinted seed were planted at 13 locations; and fuzzy seed were also included in the Arkansas and North Carolina plantings. In 3 plantings (Alabama, Tennessee, and South Carolina 1), the seeds were planted mechanically or by hand and were uniformly spaced in the row, but in the other plantings the seeds were hand-dropped in hills spaced one foot. All seed were treated with Ceresan-M at a rate of 3 gm./kg. of seed, except for the uncertainty of the amount that adhered to the delinted seed.

In 9 of the 13 plantings the mean seedling emergences for the delinted seed were significantly greater than those for the reginned seed, Table 1. In these plantings the differences between the means for these 2 kinds of seed ranged from 3 percent (Tn) to 14 percent (SC1); and in at least 4 of the plantings the differences were sufficiently large to be of practical significance. In all of the 4 plantings in which the differences between these two kinds of seed were not significant, the means for the delinted seed were slightly larger than those for the reginned seed, although in 2 plantings by only 1 percent.

Seed from the same sublots of fuzzy, reginned, and delinted seed were used in an extensive planting at Stoneville, Mississippi, that was made to compare the treatment of the 3 kinds of seed with several fungicides. In this planting, the mean emergence for the reginned lot of Coker seed was significantly lower than that of the corresponding fuzzy and delinted lots, while the differences among the 3 kinds of Deltapine seed were not significant. The mean emergence for all seed planted was 47 percent.

The number of seedlings for the fuzzy seed were significantly greater than those for both the reginned and delinted seed in the 4 North Carolina plantings. This unexplained high emergence of the fuzzy seed suggests that some variable other than the reginning and delinting treatments may have been responsible for the differences between those 3 kinds of seed. In 3 of these 4 plantings the seeds were counted and dropped by hand, so there is no question but that the same number of seeds were planted for the fuzzy, reginned, and delinted seed. In the Arkansas planting, in which the emergence was very irregular as the result of heavy rains and subsequent flooding of parts of the field, the differences between the 3 kinds of seed were not significant.

There were 6 instances of significant differences among rates in the plantings in which the seeds were uniformly distributed in the row (drilled). Four of these instances were for delinted seed in the SC1 planting in which the 2 seeds/ft. rate was lower than that for the other 4 rates. In the comparisons among rates for the 3 kinds of hill-dropped seed, there were 8 instances in which the 8 seeds/ft. rate was significantly smaller than a lower rate. One instance was for

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[1] K. S. Chester. The probability law in cotton seedling diseases. Phytopath. 31: 1078-1088. 1941.

Table 1. Percent surviving seedlings[a] for fuzzy, reginned, and delinted seed when planted at several rates per foot and the seeds were either hill-dropped or drilled in the row in the plantings of 1949.

Kinds of seed and rates	Locations and Method of Planting													
	Drilled			Planted in Hills										
Fuzzy	Ala	SC1	Tn[b]	Ark	La1	La2	Ms	NC1[c]	NC2	NC3	NC4	Ok	SC2	Tx
3				54										
4								86*	79	80	76			
5				54										
6								83	80	80	73			
8				47				80	76	78	76			
Means				52				83	78	79	75			
Reginned														
1												50		
2	57				50	69	54					48		75*
3	61	49	76	52	48	67							58	
4	61		76		45	69	47	62	56	69*	60*	54		76*
5	66*	49		54										
6		50	74		44	70		60	55	68*	59	60*	60	70
8				47			43	60	49	59	54		56	
Means	61	49	75	51	47	69	48	61	53	65	58	53	58	74
Delinted														
1												45		
2	73	49			52	73		75	58	81*	62	57*		78*
3	69	73*	80*	58	51	78							75	
4	69		78		49	75		75	61*	77*	68*	56*		76
5	68	65*		60										
6			77		48	77		75	58	75	66	57*	65	72
8		64*		54				72	53	70	65		69	
10		65*												
Means	70	63	78	57	50	76		74	57	76	65	54	70	75
LSD:														
Kinds	5	5	2	11	6	4		4	4	3	3	5	7	4
K X R	7	10	3	19	9	3	13	6	7	6	6	8	9	5

[a]Percentages are means for the two lots of seed used in the Ala, SC2, Tn, La1, La2, Tx, and Ark plantings.

[b]Planted by hand, but all seeds were spaced uniformly apart.

[c]This planting was made with a regular cotton planter; whereas, the other 3 North Carolina plantings were made by hand and the seeds were placed closer together in the hill than in NC1.

* = A rate that was significantly larger than another rate of the same kind of seed.

fuzzy seed in North Carolina1, 4 for reginned seed in NC2, NC3 (2), and NC4, and 3 for delinted seed in NC2 and NC3 (2). There were 2 similar instances for the 6 seeds/ft. rate, both of which were for delinted seed. The only instance in these comparisons in which a 2 seeds/ft. rate was significantly smaller than a higher rate for reginned seed occurred in the Oklahoma planting.

These results give some indication that under certain conditions the planting of more than a certain number of seeds per hill may result in a somewhat smaller percentage of surviving seedlings. This does not seem to apply to drilled seed.

The analyses of the yield data for the individual plantings indicated large differences between the 2 varieties in the Alabama, Arkansas, Tennessee, and Louisiana plantings. All interactions involving varieties were small except in the Arkansas plantings in which the same rate did not produce the largest yield for both varieties. The variance for kinds (fuzzy, reginned, or delinted seed) was also small; and a significant difference among them was indicated only in the Alabama

Table 2. Relation of mean yields of seed cotton in pounds per acre to stands of plants in plantings in 8 States.

Plants per row of 100 ft.	Ala	Ark	La1	La2	NC[b]	Ok	SC1	Tn	Tx
51-100	1200-3[a]	1392-9	1404-14			1044-15	948-11		
101-150	1596-11	1512-28	1776-24	1644-9	1356-5	1104-7	1188-17		996-11
151-200	1512-16	1392-42	1824-26	1668-19	1416-4	1008-4	1332-6		1056-13
201-250	1596-15	1440-26	1632-15	1644-16	1416-4	1188-10	1236-10	2172-21	
251-300	1632-5	1584-33	1836-8	1668-13	1620-9	1200-5	1380-3	2292-12	1236-11
301-400	1524-10	1512-39	1968-4	1608-17	1404-24	1200-9	1392-3	2112-16	1296-20
401-500	1464-4	1380-30	2412-4	1416-22	1476-18	1344-4	1476-2	2172-23	1572-17
501 & up		1416-8			1464-17				

[a]Number after hyphen indicates number of rows from which mean was derived.
[b]Yields for plantings NC1 and NC2 combined, since there was no evident effect for method of planting.

Table 3. Percent surviving seedlings for delinted seed treated with various chemicals.

Treatment	Dosage %	SC	Ga	NC1	NC2	Okk	Ok2
Check		50	62	48	80	64	58
Ceresan-M	0.3	45	73	60*	78	62	78*
Dow 9B	0.4	55	58	65*	79	58	66
Seedox	0.4	51	64	64*	77	58	66
Arasan	0.6	57	60	66*	78	68	52
Spergon	1.0	54	65	64*	77	56	68*
Phygon	0.5	55	71	64*	79	64	78*
CC-201[a]	0.6	60					
-854[b]	0.5	52	61	65*	76	64	54
-5400[c]	0.6	52	75	61*	81	70*	72*
USR-36L[d]	0.6	53	69	59*	79	60	68*
RH-3258[e]	0.6	51	56	54	76	60	60
M-1286[f]	1.0	43	52	53	77	54	68*
Bioquin	0.15					60	74*
Panogen	0.3					62	66
L. S. D.		18	29	9	6	5	10

*Treatment producing a significantly high number of seedlings than untreated seed.
[a]y-chloroacetoacetonilide, Carbon and Carbide Chemicals Corp. #201.
[b]Cupric y-chloroacetoacetonilide, Carbon and Carbide Chemicals Corp. #854.
[c]Reaction product of dimethyldithiocarbamate and sulfur dichloride, Carbon and Carbide Chemicals Corp. #5400. For data on these chemicals. See S. A. E. McCallan, Contr. Boyce Thomp. Inst. 16: 5-20. 1950.
[d]U. S. Rubber #36L, nitroso pyrasole.
[e]Rohm and Haas #3258, a quaternary ammonium pentachlorophenate.
[f]Monsanto #1286, Zn ethylene bis dithiocarbamate.

planting in which the reginned seed produced a 5 percent greater yield than the delinted. In 4 plantings (Ala, La1, SC1, and Tx) the variance for rates was relatively high, and was significantly so in the Texas planting. In these plantings the large variance was associated with relatively low yields for the rows with smallest number of plants, Table 2.

The relation of rate of seeding to yields is indicated in Table 2 in which mean yields are indicated for rows that were grouped according to the number of plants per 100-ft. row. In 5 plantings (Ark, Ala, La1, La2, and SC1), the yields are about the same for rows with 100 to 400 plants; while in the NC, Ok, and Tx plantings the higher yields are shown for rows with 251 or more plants per row. Generally, the largest yields were obtained with a greater number of plants than has been recommended, usually about 150 plants per 100 ft., as necessary to obtain optimal yields.

In the special study to evaluate fungicides for the treatment of delinted seed, twelve preparations were used, with two additional ones in the Oklahoma planting, Table 3. The seed used were from the same lot of seed used in the rate-of-seeding test, except that it was not treated with Ceresan-M after the seed had been delinted and the acid neutralized with soda ash. In only the NC1 planting were the number of surviving seedlings for the treated seed generally significantly larger than that for the untreated. Of the new chemicals tested, #5400 would appear to merit further evaluation as seed protectant for delinted seed.

CLEMSON AGRICULTURAL COLLEGE, CLEMSON, SOUTH CAROLINA

FIRST EPIDEMIC OF TOMATO LATE BLIGHT IN CENTRAL EAST TEXAS

P. A. Young

Cool rainy weather much of the time from May 11 to June 11, 1950, with 8.08 inches of rain on 15 days and temperatures of 15 to 25° C. about half of the time, facilitated development of late blight (Phytophthora infestans) of tomatoes in central East Texas in 1950. Hundreds of acres of tomatoes in several counties had been set with tomato plants from the Lower Rio Grande Valley of Texas. Late blight developed first in many of these slip-set tomato fields, and soon spread to nearby fields of home-grown tomato plants. This was the first epidemic of late blight in East Texas. The disease first appeared in the region in 1945 in tomato fields that had been set with plants from the Lower Rio Grande Valley[1]. It caused serious damage in some tomato fields, also set with Valley-grown plants, in Cherokee County in 1949, although one farmer near Gallatin minimized damage and made a fair profit by dusting his tomatoes often with copper dust.

The annual Field Day at the Tomato Disease Laboratory on June 6, 1950 featured an unplanned demonstration on tomato late blight. Several farmers arrived with large bunches of tomatoes showing extreme symptoms of late blight in the leaves and fruits. The owner of a two-acre field near Elkhart had refused to sell the whole crop for $1600 on June 3, by June 6, late blight had made this crop nearly worthless. Other farmers stated that late blight ruined their fields of tomatoes within five days.

One farmer near Tecula set 300 Valley-grown tomato plants in one end of a cold-frame along with home-grown tomato plants. Late blight killed all of the tomato plants in the cold frame by April 24. About 90 percent of the tomato plants in the surrounding field showed late blight.

Another farmer set an acre of Valley-grown plants in the edge of a seven-acre field. By May 23, these Valley plants showed late blight on most of the lower leaves and several of the fruits and this part of the field was abandoned; later, the disease spread over the remainder of the field and caused much loss.

Many local tomato fields were surveyed on June 9. Six fields contained mild late blight. Two other fields had areas with serious late blight but the owner had prevented heavy loss by applying copper dust repeatedly with a hand-gun duster that is much more effective than an engine-driven cotton duster. Two fields near Gallatin showed all of the plants with severe late blight that had already destroyed the lower leaves and had decreased yields of marketable fruits about 80 percent. Later, visitors brought tomatoes with late blight from other badly damaged fields. The county agents reported serious late blight in Van Zandt and Henderson Counties.

On June 13, the owner of the tomato packing shed at New Baden in Robertson County reported large loss from tomato late blight in his community, exhibited many tomatoes with late blight rot, and said that this disease was serious in tomatoes near Bremond and Marlin also.

All eight tomato fields at the Tomato Disease Laboratory at Jacksonville had been set with home-grown plants. The seven spring-crop fields were dusted six times wtih copper dust, once a week. None of them showed any symptom of late blight. The summer tomatoes were not dusted on schedule and late blight was found on three leaves.

Late blight of tomatoes and potatoes has been serious in the Lower Rio Grande Valley of Texas in some seasons since 1931[2]. Ordinary rainy or foggy weather near the Gulf of Mexico provides favorable conditions for the disease in many winters. Potatoes are raised extensively there in winter and early spring, sometimes without much crop rotation from year to year. Sprouts from hold-over tubers missed in digging or discarded in cull piles may be a source of Phytophthora infections for nearby new fields of potatoes. Later, Phytophthora may spread to nearby fields of tomato seedlings, causing damage. Airplane dusting used by some farmers is doubtfully effective in controlling late blight,

In 1950 although fruit rot of tomatoes due to late blight was not reported in the Valley because dry weather had checked the disease before harvest, one inspector stated that only the earliest potatoes were profitable, as late blight nearly ruined the remainder of the crop. In a letter dated April 26, a grower company in Brownsville, that raises about 3000 acres of tomatoes per year, reported: "Our experience this season with late blight has been most disastrous, and we have definitely made up our minds that we must procure proper spraying units and adopt a thorough spraying program before we plant either potatoes or tomatoes again".

Evidently a large percentage of the tomato seedling plants are affected by late blight, as latent infections or inconspicuous spots, when they are thinned from the fields and trucked from the

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[1]Young, P. A. Late blight of tomatoes at transplanting time. Phytopath. 36:389-391. 1946.
[2]Taubenhaus, J. J. and W. N. Ezekiel. Late blight of tomatoes and potatoes. Texas Agr. Exp. Sta. Circ. 60. 1931.

Lower Rio Grande Valley to East Texas; this was especially so in 1950. Farmers in East Texas could avoid late blight by using only home-grown tomato plants, as they did from 1897 until 1944.

Late blight appeared on fall tomatoes also this year, for the first time in East Texas. It killed about one-third of the leaves in five acres, and about one-tenth of the leaves in the remaining seven acres, of a field of fall tomatoes near Quitman by October 9. This field was not dusted before blight became destructive. Two fields of fall tomatoes near Golden (Wood County) showed some late blight in about 1 percent of their plants. Both fields had been dusted regularly with copper. Truckers stopped buying at Golden when they found tomato fruits with typical brown late-blight spots. Late blight appeared in the fall tomato plants in the cool rainy foggy weather from September 26 to October 8, the seedlings having been presumably infected from old blighted tomato plants in local fields last summer. Freezes are likely to kill tomato leaves and stems in winter. However, the farmers were advised to plow out the plants as soon as they finish picking the tomatoes, as a precaution to prevent overwintering of any blighted plants.

TOMATO DISEASE LABORATORY, TEXAS AGRICULTURAL EXPERIMENT STATION, JACKSONVILLE, TEXAS

SOME NOTEWORTHY DISEASES OF VEGETABLE CROPS IN MASSACHUSETTS THIS YEAR

O. C. Boyd

Downy Mildew of Cucurbits. Cucurbit downy mildew (Pseudoperonospora cubensis) struck cucumbers in Plymouth and Bristol Counties during the last week of August or the first week of September, then developed only moderately rapidly on the few late cucumber plantings until frost took the vines about the beginning of October. It attacked unprotected or poorly sprayed cantaloupes vigorously during the week of September 17, but has not been observed on squash and pumpkin vines. The disease arrived too late to do any damage to the early plantings of cucumbers in the State, or to appear at all on the extensive pickle fields in the Connecticut River Valley.

Late Blight. Late blight (Phytophthora infestans) failed to reach epidemic proportions on either potato or tomato. It was present on unprotected tomatoes in the western half of the State from mid-August onward, but caused only slight damage to the foliage and still less to the fruits. It was correspondingly active in poorly protected potato fields and gardens, but was not difficult to control in either. The weather from mid-August to mid-September was neither unduly cool nor abnormally moist.

Spinach "Blight" (Virus). In early October I observed the worst case of mosaic or "blight" in spinach that I ever saw -- in Plymouth County on Longstanding Bloomsdale, seeded on July 15 and July 22. At least 95 percent of the plants were plainly affected, and over 50 percent showed the severe symptoms of plant stunting and shoe-stringing of most of the later leaves. The first leaves were yellowed, curled downward, and some of them brown and dead.

Judging from the symptoms, the cause was the cucumber mosaic virus. A heavily infected, early planted field of cucumbers was located nearby. The two plantings of spinach were a total loss. A somewhat later seeding of blight-resistant Savoy, only a few yards distant, showed only a trace of the disease.

Virus Diseases of Cucurbits. In no previous season have the cucurbit viruses been so damaging. It is doubtful if a single planting of slicer or pickling cucumbers escaped mosaic, and some fields, the earlier plantings in particular, were almost totally destroyed. Even the fields and gardens that were thoroughly dusted or sprayed so as to control most of the important pests, suffered moderately to severely. The striped cucumber beetle was never scarcer than it was this year, aphids were about normal, and thrips were abnormally numerous.

Verticillium Wilt of Potato. This disease, which has become increasingly important in the high elevation or hill-town fields of Massachusetts, was extremely damaging to certain fields both last year and this year. It is a problem only on old potato land where continuous or nearly continuous potato culture is practiced. The heaviest case observed this year was in a field of Kennebec, growing alongside Katahdin which was only lightly affected. Hill-town growers are finding

it necessary to practice at least a two-year rotation (one intervening crop between potatoes) in order to keep the disease at a low ebb.

This year, as in previous seasons, some of the tubers in at least some of the hills of Verticillium-affected fields are showing the peculiar necrotic pinkish-brown or tan lesions at or sometimes between the eyes, in addition to or independent of the characteristic yellowish-brown "ring" in the stem end of the tuber. Verticillium is readily cultured from the underground stem and the branches, with difficulty from the discolored "ring", and not at all from the external tuber lesions at and between the eyes.

MASSACHUSETTS STATE COLLEGE, AMHERST

PEA DISEASES IN SOUTHWESTERN ONTARIO IN 1949 and 1950

J. D. Gilpatrick and L. V. Busch

During 1949 and 1950 fields of garden peas were inspected for disease in Huron, North Simcoe and South Simcoe Counties in Ontario. In 1950, Essex County was also included in the survey. Of the 40 fields examined, representing 450 acres, 34 were grown for seed purposes, the remaining 6 for canning. All crops were examined at the early flower to flat pod stage.

Leaf and pod spot (Ascochyta pisi) was found in 17 fields. Damage was a trace in 16 and severe in one. This disease was also present in 3 volunteer stands of Vicia villosa in Brant, Norfolk, and Haldimand Counties.

Root rot (Fusarium solani f. pisi) was present in trace amounts in most fields. Damage was severe in two fields with 100 percent kill in one and 50 percent in another.

Downy mildew (Peronospora pisi) caused slight to moderate damage in 3 fields in 1950. This, to the authors' knowledge, is the first occasion that this disease has been reported to be of importance in Eastern Canada. Fushtey (1) found infection a trace to slight in 9 out of 36 fields examined in Southern Alberta in 1948.

Bacterial blight (Pseudomonas pisi) was present in two fields -- a trace in one in 1949 and moderate in another in 1950.

Other diseases observed near Guelph, Wellington County, included powdery mildew (Erysiphe polygoni), rust (Uromyces fabae) and blight (Mycosphaerella pinodes).

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DEPARTMENT OF BOTANY, ONTARIO AGRICULTURAL COLLEGE, GUELPH, ONTARIO, CANADA

STEM RUST ON WHEAT IN NORTH DAKOTA

W. E. Brentzel

The stem rust (Puccinia graminis) epidemic of 1950 was the most destructive since 1935. Surveys made in North Dakota showed that rust was widespread and in epidemic form in the eastern portion of the State. In the hard wheats the severity of infection ranged from a trace in the western part to as much as 80 to 90 percent in the eastern portion of the State. The infection was particularly severe in the Red River Valley, increasing in intensity from Grand Forks south to the border. The intensity of rust increased rapidly after August 1. On August 9 the most severe infection noted was 20 percent, on August 16 a field in Cass County showed from 60 to 80 percent severity, and on August 18 fields in Traill County showed as high as 90 percent severity.

Durum fields were damaged more severely than the hard wheats, owing to the fact that they were somewhat later in maturing and are grown mostly in the northeastern part of the State where the season is somewhat later. Varieties which heretofore have been considered resistant became severely damaged with stem rust this year. Red durum (D-5), notoriously known for its rust resistance and a variety which has resisted rust in all epidemics since 1914, rusted severely this year in North Dakota. The difference in resistance between the common amber durum varieties was not marked. All seemed to carry severe infection.

The cause for the 1950 epidemic is two-fold. Seeding throughout the eastern part of the State was the latest on record, because of floods and a very late spring season. The date of seeding was in most cases from four to six weeks later than normal, and the date of harvest was almost as late. Between seeding and harvest, temperatures remained cool and favorable for rust propagation. Perhaps the most important cause was the appearance of a race of rust uncommon or not heretofore known to occur in the Red River Valley. The tragic part of the situation is that a foreign race to which spring wheats are very susceptible made its appearance in this region and found extremely favorable conditions under which to develop. The losses from stem rust this year have been severe, but of more concern is the lack of suitable varieties for growing next year and in subsequent years. It seems logical to expect that the race or races of rust which developed this year to such a great extent will be able to return and continue their destruction until such a time as resistance or other control measures are developed.

NORTH DAKOTA AGRICULTURAL COLLEGE, FARGO

TESTS OF SEED TREATMENTS ON SORGHUM SEED IN 1950

R. W. Leukel

Laboratory and field investigations of the effectiveness of relatively new fungicides, in comparison with more or less standard materials, were continued at the Plant Industry Station at Beltsville, Maryland, in 1950. The results of the tests with spring barley and oats have been reported (1). The experiments in which sorghum was used as a test crop followed the general plan of those carried out in 1949 (2).

Separate portions of seed of Texas Blackhull kafir and Leoti sorgo, were inoculated with covered kernel smut at a 1 to 200 spore dosage, and were treated with different fungicides on May 9, 1950. Emergence tests were made in non-sterilized soil at 20° and 25° C., one week after treatment. Field plantings were made in triplicated 25-foot rows June 8. The data on emergence and on the control of covered kernel smut are presented in Table 1.

Table 1. Emergence from treated and untreated seed of Texas Blackhull kafir and Leoti sorgo at 20° and 25° C., planted in non-sterilized soil one week after treatment; and the percent of heads infected with covered smut in field plots planted one month after treatment at Plant Industry Station, Maryland, 1950.

Seed Treatment[a]		Emergence from seed of[b]				Total and smutted heads in[c]			
		Kafir		Leoti		Kafir		Leoti	
Fungicide	Rate per bu.	20°C	25°C	20°C	25°C	Total	Smutted	Total	Smutted
	Oz.	%	%	%	%	No.	%	No.	%
Untreated	--	69	85	57	65	320	43	155	44
Anticarie	1	73	85	64	65	320	25	115	18
Arasan	2	76	91	60	67	375	0	120	0
Copper carbonate	2	77	88	67	70	330	0	145	0
Phygon	2	73	88	65	66	310	0	155	0
Spergon	2	77	88	57	66	300	0	175	0
Aagrano 48	2	67	86	79	69	330	0	160	0
Aagrano 250	1	66	94	62	65	280	0	195	0
Ceresan M	1/2	70	91	57	58	280	0	140	0
Dynacide	1	73	92	67	65	290	0	160	0
Untreated	--	69	85	57	65	300	38	96	23
Mercuran A.S.	1/2	86	85	71	68	406	0	84	0
Semenon	2	80	91	73	67	330	0	143	0
Arasan (slurry)	1 1/2	79	91	70	70	305	0	110	0
Phygon "	2	76	86	68	73	312	0	100	0
Ceresan M "	1/2	65	88	60	70	280	0	140	0
Mercuran A.L.[d]	1/2	69	87	59	65	340	1.5	64	8
Panogen[d]	3/4	64	88	71	68	310	0	105	0
" [d]	1	67	86	61	74	310	0	125	0
" [d]	1 1/4	65	84	65	65	215	0	245	0
Untreated	--	75	84	--	--	134	50	---	--
C and C L-224	2	85	84	--	--	150	0	---	--
C and C No. 640	2	85	86	--	--	155	0	---	--
C and C No. 5400	2	82	86	--	--	200	0	---	--

[a] All treatments were applied as dusts unless indicated otherwise.
[b] Underscored figures indicate significant difference compared with check.
[c] Extremely poor stands in some rows were due to poor drainage and weeds.
[d] Applied by the "quick wet" method.

The results of the emergence tests are not very consistent. At 20° C. emergence from 11 of the 18 treated lots of kafir was better than that from untreated seed, but only three of these differences approach the level of significance. There were no significant increases over the check at 25° C. and no significant decreases at either temperature.

In Leoti there were eight significant increases over the check at 20° C. and one at 25°. There were no decreases at 20° C.

All treatments except Anticarie and Mercuran A.L. controlled covered kernel smut perfectly in both varieties.

The three C & C dusts, L-224, 640 and 5400, were received two days before planting time and hence the results from these materials and the corresponding check are not comparable with results from the other treatments. L-224 is a zinc mercury chromate complex that has shown promise as a corn seed treatment. No. 640, a zinc-copper-chromate complex, and No. 5400, a "reaction product of dimethyl dithio carbamate and sulfur dichloride," while less widely tested than L-224, have been found beneficial as seed treatments for corn and some vegetables (3).

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DIVISION OF CEREAL CROPS AND DISEASES

SUSCEPTIBILITY OF ALFALFA PLANTS TO COLLETOTRICHUM TRIFOLII[1]

Fred Reuel Jones[2]

In 1947 Colletotrichum trifolii Bain & Essary, best known as the cause of southern anthracnose of red clover, was found girdling the bases of stems of sweetclover plants in a nursery at Madison, Wisconsin. One selection of sweetclover was nearly destroyed by the fungus, and scattered plants in unselected stocks were found girdled not only in this nursery, but in nearby locations. In the course of a study concerning the susceptibility of this strain of sweetclover, the fungus became scattered in the greenhouse in spite of precautions, and destroyed many alfalfa seedlings. The fungus was apparently taken to the field with seedlings, and in the wet summer of 1950 became widespread and locally destructive in the alfalfa nursery. In both the greenhouse and nursery certain selfed lines and crosses appeared to be far more susceptible than others. In the greenhouse a selection seeded in one end of a flat might be almost destroyed while a selection in the other end might be little injured. In the field, some lines showed but few small lesions at the bases of stems, while in others the most of the stems broke at the severe lesions, buds at the crown died, and finally in many plants the woody center of the crown decayed, developing a black or blue-black color as the dead tissue dried.

From an inspection of the history of the severely injured lines it appeared that susceptibility was inherited from a few plants that had been used recently in crosses. It was possible to support this hypothesis in a few cases by the inoculation of young clones from the suspected plants. The majority of the selected plants used in the nursery did not appear to be very highly susceptible to the fungus; but combinations of susceptible plants appeared to give a population as highly susceptible as the selection of sweetclover on which the fungus first attracted attention.

Differences in the reaction of alfalfa varieties and of plants to Colletotrichum trifolii have been noted previously. D. C. Neal noted differences in susceptibility of varieties (Mississippi Agr. Exp. Sta. Rept. 37: 28-31, 1923-4), and differences in susceptibility of clonal lines at Beltsville in 1949 were noted in a letter by Dr. O. S. Aamodt to the writer. In regions as far north as Wisconsin the fungus has been rarely recorded. However, the experience in the nursery noted above may be regarded as indicating that the use of highly susceptible lines of either sweetclover or alfalfa might be followed by injury of economic importance from this fungus even in this region.

U. S. DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY, SOILS AND AGRICULTURAL ENGINEERING, AND WISCONSIN AGRICULTURAL EXPERIMENT STATION

ALFALFA YELLOWS IN VIRGINIA

S. B. Fenne and J. O. Rowell

During August and September, numerous complaints were received concerning yellowing and general unthriftiness of alfalfa. Many of these alfalfa fields were visited by members of the Plant Pathology and Entomology Departments, in an attempt to determine the cause of this unusual condition.

In practically all cases where the alfalfa appeared yellow and generally unthrifty, various leaf spot diseases could be found. However, the leaf spots were not considered to be causing sufficient injury to produce the yellowing and decline which was so frequently observed. Any condition that will contribute to the general decline or weakening of the alfalfa plant will tend to make it more susceptible to leaf spot diseases. This includes injury from insects and improper fertilization.

In almost every case where a yellowing of alfalfa was observed, evidence of girdling and other injury, caused by the three-cornered alfalfa hopper, was seen. Ordinarily, this insect is not present in sufficient numbers to cause severe injury to alfalfa. However, because of the unusually mild winter this year, large numbers of the hoppers survived and severe injury resulted.

The three-cornered alfalfa hopper, Stictocephala festina, is a small, pale-green sucking-type insect which has been observed in injurious populations several times in Virginia since 1914.

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[1]Contribution from the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, U. S. Dept. of Agriculture, in cooperation with the Wisconsin Agricultural Experiment Station, Madison, Wisconsin.

[2]Senior Pathologist, Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering.

The last outbreak in this State occurred in the summer of 1941. The insect is noticed, especially, following mild winters such as we have experienced for the past two years.

The three-cornered alfalfa hopper lives on a great variety of food plants. Injury to alfalfa is the result of the sucking up of the plant juices by the nymphs and adults, which leaves the plant wilting and often in a dying condition. The insect has two methods of feeding. The real damage to alfalfa results from the puncturing of the stems in a regular and continuous line which takes the form of a ring or girdle around the plant. In addition to the loss of plant juices, the stems are weakened, a gall usually develops, circulation is cut off from the upper portion of the plant, and many of the plants become yellow, break off, and die. The nymphs do considerably more damage than the adults.

VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG

POWDERY MILDEW ON OUTDOOR SNAPDRAGONS IN CALIFORNIA

Neil A. MacLean and Kenneth F. Baker

Since the recent publication of a note on the occurrence of powdery mildew (Oidium sp. of the Erysiphe cichoracearum type) on greenhouse snapdragons in California (1), the same fungus has been found occurring on the crop in home gardens in the Los Angeles and Berkeley areas under somewhat humid, shaded conditions. The pathogen was also found causing severe foliage injury on a commercial planting under lath in the East Palo Alto area.

Examination of commercial seed fields in the San Juan and Salinas areas in late August, 1950 failed to disclose the presence of the fungus despite the fact that the environment was favorable for copious development of powdery mildews on other ornamental crops and weeds. It should be noted that the snapdragon plantings had been dusted with sulfur for rust control and the question, therefore, remains open as to whether the pathogen has spread to these areas.

Evidence for the recency of introduction of the fungus was strengthened by the absence of the fungus on snapdragon plants in seed fields in the Arroyo Grande, Guadalupe, Santa Maria, Lompoc, and Santa Paula areas in August, 1950, even on plants not dusted with sulfur. Probably the fungus has recently been introduced on greenhouse planting stock into the San Francisco and Los Angeles areas of California and its spread has so far been limited to these two areas.

Literature cited

1. Baker, K. F., and N. A. MacLean. Powdery mildew of snapdragons on the Pacific Coast. Plant Dis. Reptr. 34: 183-185. 1950.

DIVISION OF PLANT PATHOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY 4, AND LOS ANGELES 24

CANKERS AND DECAY OF OAK ASSOCIATED WITH IRPEX MOLLIS

Elmer R. Roth

Irpex mollis Berk. & Curt. is commonly found in the Southeast fruiting on decayed hardwood logs. It is also associated with cankers of living oaks and is sufficiently abundant to warrant a description of the cankers and associated decay. Davidson et al. (2) report that it is found on living trees of several hardwood species, often associated with trunk cankers. Campbell, Miller, and Thompson (1) have reported it as associated with cankers on oaks in Georgia.

Cankers associated with fruiting of Irpex mollis have been found on white oak, chestnut oak, southern red oak, and black oak. The cankers are fairly common in the vicinity of Walhalla, South Carolina, and are found to some extent in adjacent areas in Georgia. These cankers always had a branch stub at the center and were connected with considerable rot in the bole of the tree. The decay appeared to be centered at the branch stub in the center of the canker, indicating that the fungus gained entrance through the stub, causing the subsequent canker and rot. The sporophores of I. mollis are small, creamy-white, leathery, with the fruiting surface broken up into short jagged teeth (Fig. 1, B).

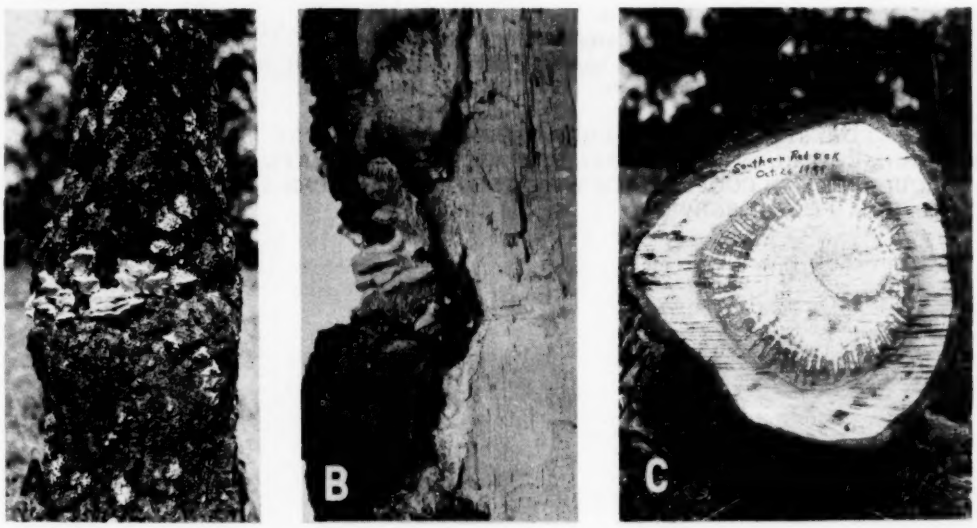


FIGURE 1. Irpex mollis cankers and decay.

A. Irpex mollis fruiting in canker on 8-inch southern red oak.
B. Longitudinal section showing fruiting and rot.
C. Cross-section showing cylinder of rot 2 feet below canker. Note finger-like rotted areas extending to edge of heartwood.

In its early stage, the decay appears as creamy white radial lines, concentrated for the most part along the rays (Fig. 1, C). In more advanced decay the wood between the ray cells is broken down, giving the rotted wood a tough spongy appearance. In cross section much of the heartwood cylinder is usually badly decayed, with numerous finger-like rotted areas radiating out toward the sapwood along the ray cells. In some cases, water-soaking extends longitudinally beyond the fingers (Fig. 1, C). Cultures of the fungus were easily obtained from the decayed wood behind the cankers. The cultural characteristics of the fungus have been described by Davidson et al. (2) as being very similar to those of Polyporus obtusus Berk. in both microscopic and macroscopic characteristics.

Vertically, the region of advanced decay continues for several feet, tapering to a thin central core. Beyond this central core of advanced decay, small white flecks occur, indicating incipient decay. The fungus is easily isolated from these flecks, often extending as much as a foot or two beyond the advanced decay.

Cankers associated with Irpex mollis were usually found on trees 8-10 inches in diameter, breast high, and larger. Loss due to I. mollis is believed to be of minor economic importance

except in local areas where conditions are favorable for its development.

One canker was fruiting 4 feet above ground on a southern red oak. When this tree was felled and dissected, advanced decay was found to extend upward from the canker for a distance of 5 feet and downward into the roots.

Irpex mollis cankers have been found from stump height to a height of 20 feet above the ground. None of the cankers observed had characteristics that would distinguish them from some other types commonly found on oak. The cankers were usually accompanied by a slight swelling (Fig. 1, A). All of them had a branch stub as a focal point, and many were deep, rough, and sunken. Others were of the diffuse type with sunken areas about 2 feet long and 8 to 10 inches wide. So far as could be determined, there is no way of identifying such cankers unless cultures are made or sporophores are present.

There is apparently no relation between tree vigor and the occurrence of Irpex mollis cankers, since they were found on both slow-growing and fast-growing oaks on both good and poor sites.

Literature cited

1. Campbell, W. A., J. H. Miller, and G. E. Thompson. Notes on some wood-decaying fungi of Georgia. Plant Dis. Reptr. 34: 128-134. 1950.
2. Davidson, Ross W., W. A. Campbell, and Dorothy Blaisdell Vaughn. Fungi causing decay of living oaks in the eastern United States and their cultural identification. U. S. Dept. Agr. Tech. Bul. 785. 65 pp., illus. 1942.

DIVISION OF FOREST PATHOLOGY, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, AGRICULTURAL RESEARCH ADMINISTRATION, U. S. DEPARTMENT OF AGRICULTURE. IN COOPERATION WITH THE SOUTHEASTERN FOREST EXPERIMENT STATION, U. S. FOREST SERVICE

OBSERVATIONS ON CRONARTIUM STROBILINUM IN GEORGIA

Bratislav Zak

Cones of slash pine, Pinus caribaea, infected with Cronartium strobilinum were collected in the vicinity of Pine Harbor, Georgia, during June of this year. The range of this cone rust fungus had previously been reported as including Florida and Mississippi (1, 2). At the time of collection infected cones had the same color as healthy ones; the aecial cavities had ruptured several months earlier. About 50 percent of the cones of one felled tree were diseased. Observations made by foresters during early spring when aeciospore discharge was in progress indicated a mild epidemic in the coastal stands of slash pine north of Brunswick, Georgia.

Literature cited

1. Boyce, J. S. Host relationships and distribution of conifer rusts in the United States and Canada. Conn. Acad. Arts, Sci. Trans. 35: 329-482. 1943.
2. Hedgcock, G. G., and G. G. Hahn. Two important pine cone rusts and their cronartial stages. Part I. Cronartium strobilinum (Arthur) Hedgc. and Hahn, comb. nov. Phytopathology 12: 109-116. Illus. 1922.

DIVISION OF FOREST PATHOLOGY, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING IN COOPERATION WITH THE SCHOOL OF FORESTRY, UNIVERSITY OF GEORGIA, ATHENS

SPHACELOMA VIBURNI DESTRUCTIVE TO SNOWBALL IN MARYLAND

Anna E. Jenkins and R. A. Jehle

In early August this season our attention was called to a severely diseased snowball (Viburnum opulus var. roseum L.) growing on the outskirts of Pocomoke, Worcester County, southeastern Maryland. This particular shrub is an old dooryard planting of unknown origin on the farmstead of Willard T. Pilchard, who previously had not observed it in such a dilapidated condition. Distorted, discolored, and extremely ragged foliage constituted the impressive symptoms. Leaves severely diseased often were curled inward more than normally. The leaf blade was sometimes wrinkled and bulged from the numerous leaf spots. The spots often were not over 2 mm. in diameter, grayish at the center with a noticeable brown border. In some cases the leaves were completely spotted, in others they were more or less streaked from the disposition of the lesions in the direction of the venation. Because of the severity of the attack large areas were often completely killed and the leaf left jagged and torn by the falling away of the brittle, dead tissue. On the lower leaf surface the spotting appeared as brown interveinal and veinal discolorations (Fig. 1). Small cankers also were detected on the young stems. If the plant were striking in its disfiguration on August 2, by September 13, when it was again seen, it was practically a skeleton with only a few leaves remaining on the tips of several branches.

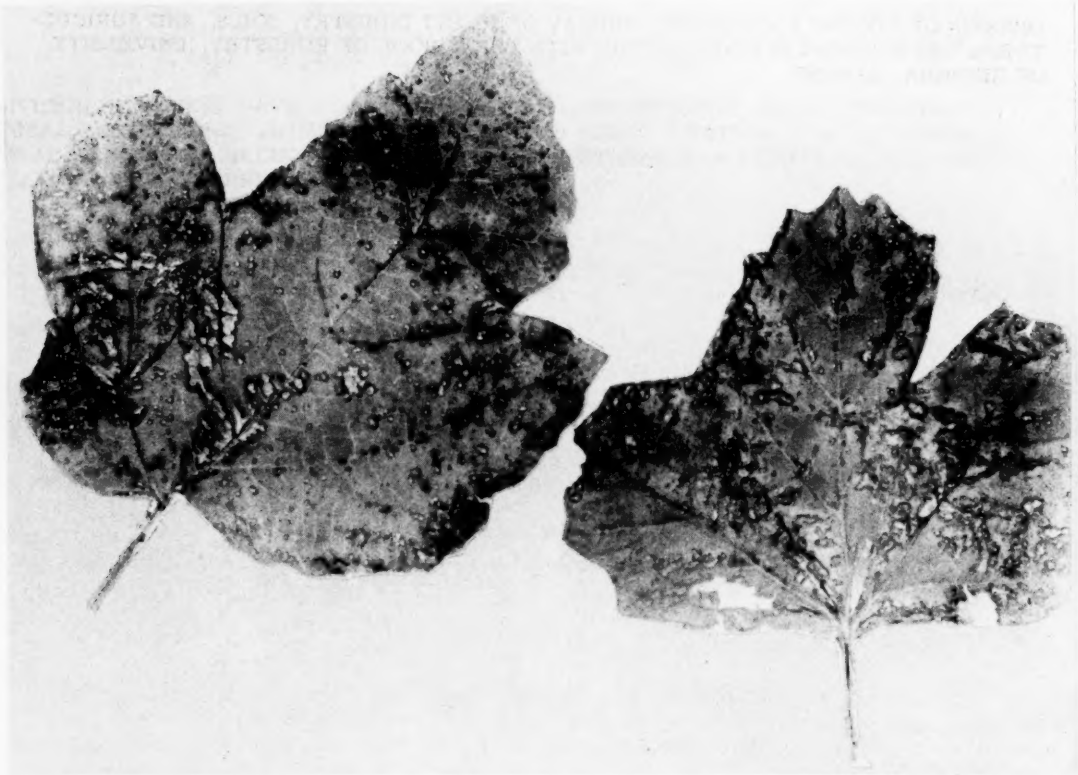


Figure 1. Sphaceloma viburni on snowball leaves, outskirts of Pocomoke. Photograph, courtesy of W. F. Jeffers, University of Maryland.

Although the central areas of the lesions appeared clear grayish to the naked eye, viewed through a hand lens or binocular they were found to be specked with dark fructifications of a fungus which proved to be Sphaceloma viburni Jenkins & Bitancourt (Jour. Wash. Acad. Sci. 36: 420. 1946, Fig. 2, D-F).

On the same visit to Pocomoke, a mild infection by the Sphaceloma was found on another dooryard snowball, in this case on Winterquarters Drive in the city. On the most recent trip to

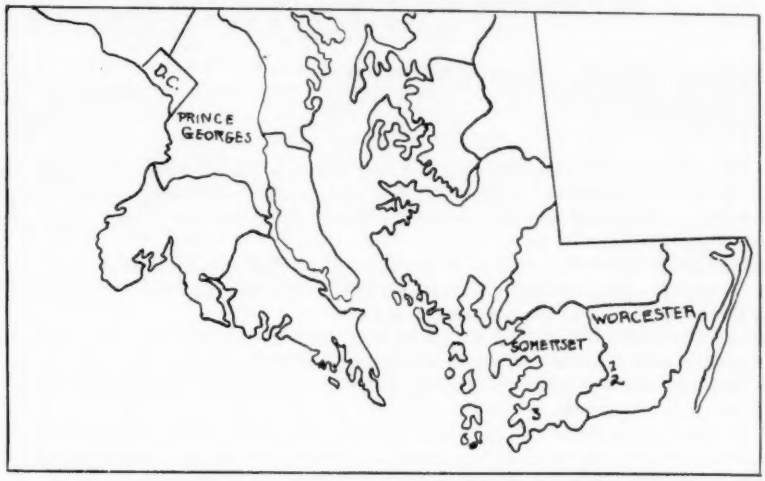


Figure 2. Map of the Eastern Shore of Maryland showing the localities in which Sphaceloma viburni was found.
1. Outskirts of Pocomoke. 2. Pocomoke
3. Marion.

southeastern Maryland, September 20, moderate infection was discovered on snowball growing in another locality, viz. Marion, Somerset County (Fig. 2). Near Oakland, Garrett County, and on the Campus, University of Maryland, College Park, Prince Georges County, no evidence of the disease was detected.

The only previously recorded distribution of Sphaceloma viburni on snowball is at Roseburg, Wakiakum County, and Chinook, Pacific County, Washington, where the disease was discovered in 1943-44 by representatives of the U. S. Bureau of Entomology and Plant Quarantine. The other recorded host is sandankwa viburnum (V. suspensum), on which the fungus was found at Riverside, Riverside County, California, in 1942 by H. S. Fawcett, R. H. Buller, and A. A. Bitancourt (cf. Jenkins and Bitancourt, loc. cit.). Specimens from Washington State have been distributed in the Jenkins-Bitancourt "Myriangiales selecti exsiccati" (Nos. 349 and 350).

DIVISION OF MYCOLOGY AND DISEASE SURVEY, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING AND DEPARTMENT OF PLANT PATHOLOGY, UNIVERSITY OF MARYLAND

NEW RECORDS AND UNUSUAL OCCURRENCES OF PLANT DISEASES

PRUNUS ANGUSTIFOLIA, A HITHERTO UNREPORTED HOST OF GLOMERELLA CINGULATA

By D. H. Petersen, and Glenn KenKnight

In June 1950, while surveying the commercial peach area of central Georgia for range and distribution of peach anthracnose, a plum thicket with a high percentage of diseased fruit was noted. The thicket, composed of rootstocks of a small plum orchard, was subsequently identified as Prunus angustifolia.

The diseased fruit showed circular brown lesions, a few of which were seen to have salmon-colored spore masses. Upon collection and storage in the laboratory at room temperature many of the lesions bore these characteristic spore masses.

Pure cultures, which were easily obtained from the spore masses, were compared culturally and microscopically with isolates obtained from peach and apple infected with Glomerella cingulata. The variation noted was well within the range given by Shear and Wood (1) for G. cingulata (Stonem.) Spauld. & v. Schrenk.

Adjacent to the plum thicket, a peach orchard was severely infected with peach anthracnose and on the other side of the thicket anthracnose lesions were found on dead stems of blue lupine. The causal organism in both cases is known to be Glomerella cingulata.

Literature cited

1. Shear, C. L., and Anna K. Wood. Studies of the fungous parasites of the genus Glomerella. U. S. Dept. Agr., Bur. Pl. Ind. Bul. 252: 1-110. 1913.

DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, AGRICULTURAL RESEARCH ADMINISTRATION, U. S. DEPARTMENT OF AGRICULTURE

BACTERIAL BLIGHT OF PERSIAN WALNUT IN ILLINOIS

By H. W. Anderson

Specimens of Persian (English) walnuts (Juglans regia) received September 20 from Delavan, Tazewell County, Illinois showed typical symptoms of bacterial blight on the fruit, leaflets, petioles and rachis. Microscopic examination of these organs showed typical bacterial oozing at the edge of the lesions. The bacteria were especially abundant in the hull and petiole lesions. Isolations gave the lemon yellow colonies of Xanthomonas juglandis.

The grower stated that the trees were seedlings of the Carpathian Persian walnut, the seed of which was imported by Rev. Paul Crath from the Russian Ukraine.

An examination of a number of Persian walnuts maintained in the Horticulture Department nut planting at Urbana showed the presence of the disease on the leaflets of several trees.

This disease has not been previously reported from Illinois so far as I can determine. It seems evident that bacterial blight has been present for several years but that the favorable weather conditions for the development of the disease this season called it to the attention of the grower at Delavan. Also, this is the first year that the nuts were abundant enough to call attention to the conspicuous hull infections. Persian walnuts are not extensively grown in Illinois but a few enthusiasts are trying out some of the hardier strains.

UNIVERSITY OF ILLINOIS, URBANA

INTERNAL BROWNING OF TOMATOES IN VIRGINIA

By S. B. Fenne

For the second year, a new trouble affecting tomatoes has been observed on commercial truck farms in Virginia. This new trouble is called internal or "vascular" browning.

Vascular browning appears on the outer surface of tomato fruit as a grayish-brown translucent discoloration, or as if normal pigment had been inhibited. These tomatoes appeared very similar to the description given by Conover (PDR 33: 383-284. 1949), and by Holmes (Phytopath. 40: 5. 1950).

A similar trouble has also been observed in a few home gardens.

VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG

VERTICILLIUM WILT OF COTTON IN LOUISIANA IN 1950

By D. C. Neal

In surveys made during July and August, Verticillium wilt, V. albo-atrum, was found in several fields in Caddo, Bossier, and East Carroll Parishes, the infection ranging from 5 to 30 percent. The Caddo-Bossier area is in the Red River alluvial cotton section of the State and East Carroll Parish is in the Louisiana delta bordering the Mississippi River. The soil types, as designated by the soil technologists for the Red River area, are Miller clay loam, Miller silty-clay loam, and Yahola fine and very-fine sandy loam. The first type, Miller clay loam, is heavy-red, stiff soil and is alkaline in reaction. No Verticillium wilt was found in this soil; however, in the case of the second type, Miller silty-clay loam, a moderately heavy soil and commonly known as mixed soil by growers in the area, the disease was found in several fields. The variety affected was Deltapine 15. Isolations of the fungus were obtained from both root and stem sections of infected plants.

On August 25, the disease also was observed in East Carroll Parish near Lake Providence, Louisiana. The soil type for this area is designated as Moohn -- heavy, silty-clay loam -- with reaction usually neutral to alkaline. The highest infection observed here was approximately 30 percent in an 80-acre field of Deltapine 15. The disease was also found in a planting of Delfos 9169 in this delta parish. The presence of the disease in this area also was confirmed by several isolations of the fungus.

This wilt is now known to occur in three of the important cotton-producing parishes of the State.

UNITED STATES DEPARTMENT OF AGRICULTURE, DIVISION OF COTTON AND OTHER FIBER CROPS AND DISEASES IN COOPERATION WITH LOUISIANA AGRICULTURAL EXPERIMENT STATION AND EXTENSION DIVISION

A CORRECTION

In Supplement 195, on page 409, line 4, the variety name "Hales No. 45" should be changed to "Powdery Mildew Resistant Cantaloup No. 45". In line 9, "Powdery Mildew Cantaloup No. 6" should be changed to "Powdery Mildew Resistant Cantaloup No. 6". -- S. P. Doolittle, Division of Fruit and Vegetable Crops and Diseases.

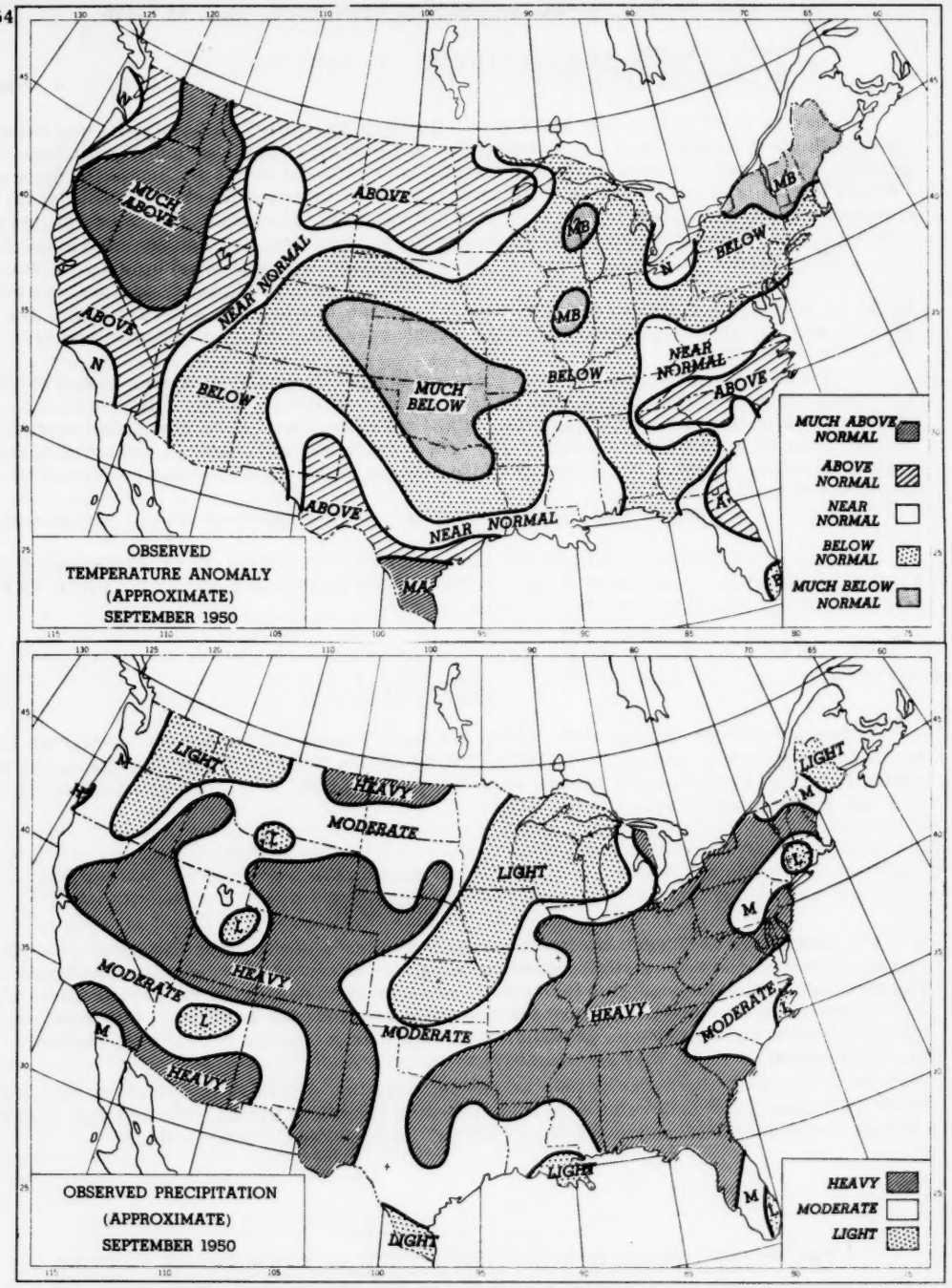
ATTENTION PLEASE!

The committee on "Vegetable Breeding and Varieties", of the American Society for Horticultural Science, requests aid from plant pathologists interested in vegetable crops breeding. The Committee's major objective for 1950-51 is a survey to determine the personnel, location, and objectives of breeding programs, and materials available for exchange. In order to make the survey as comprehensive as possible, the Committee is anxious to reach all vegetable breeders, whether or not they are members of the A.S.H.S.

R. E. Larson, Chairman of the Committee, asks that pathologists conducting such work send their names and data relative to their breeding programs to him. His address is Horticulture Department, Pennsylvania State College, State College, Pennsylvania.

ANNOUNCEMENT: THE PLANT DISEASE SURVEY CONFERENCE AT THE MEMPHIS MEETING

This year's Plant Disease Survey conference will be devoted to exploration of the desirability and feasibility of reinstating regular compilation of crop loss estimates. We hope to obtain thorough discussion, both for and against. Recent events have shown that there are occasions when estimates are indispensable. The question before the conference is: should we keep the estimates current, and would we be able to do so even if we should? We invite pathologists to state their opinions. Time and place are given in the Society's program.



The terms used in the accompanying maps, which define the ranges of temperature and precipitation, are numerical class limits. These are based on a statistical analysis of past records through which is determined the normal frequency of occurrence of temperatures and precipitation at various times of the year for different locations. For temperature the classes above, below, and near normal are so defined that they each normally occur one-fourth of the time; much above and much below normal, one-eighth of the time. Precipitation is depicted in terms of light, moderate, and heavy, each class normally occurring one-third of the time and thereby having equal probability of occurrence. These maps graphically represent only the general trends and give the country's weather picture at a glance. For quantitative studies, where monthly mean temperatures and actual precipitation records are needed for a given time and place, other publications of the Weather Bureau should be consulted. P. R. M.